

## ABSTRACT OF THE DISCLOSURE

Distributed fiber optic chemical and physical sensors provide a relatively highly uniform response over the length of the fiber by, for example, varying such properties as the core/cladding index of refraction ratio to compensate for the non-linearity in sensitivity due to the loss of higher order modes in multi-mode fibers. The variation of the ratio changes the absorption coefficient of the fiber and can be used to compensate for any non-linearity in response. Other techniques for compensation also are disclosed.